Agni College of Technology
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ISO 9001:2015 Certified Institution: Estd.2001
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DEPARTMENT OF MECHANICAL ENGINEERING

LAB-BASED INCIDENTAL LEARNING METHOD

Academic year	: 2022-2023
Degree	: B.E.
Year & Semester	: II/IV
Course Code & Title	: ME3451 / Thermal Engineering
Name of the Faculty Member	: Dr. L. Ranganathan
Date	: 15/02/2023
Innovative Practice	: Lab-Based Incidental Learning Method
Topic	: IC engine – Classification, working, Components and their functions
Total Students Participated	: 16

Introduction

Lab-Based Incidental Learning is a student-centered teaching approach in which learning occurs naturally through observation, hands-on exposure, and informal interaction during laboratory sessions. Instead of delivering all concepts through structured lectures, this method allows students to acquire knowledge incidentally while engaging with real equipment, models, and experimental setups. In the study of Internal Combustion Engines, concepts such as engine classification, working principles, component identification, and functional understanding are best learned through direct laboratory exposure. By observing actual IC engine setups, cut-section models, and operating mechanisms, students intuitively connect theoretical concepts with real components and their functions. This method encourages curiosity-driven learning, improves concept retention, and enhances practical understanding. Lab-Based Incidental Learning supports Outcome-Based Education by fostering experiential learning, improving student engagement, and strengthening the linkage between classroom theory and real-world engine applications.

Methodology

Identification and Handling of Engine Components

- Students physically handle components such as piston, connecting rod, crankshaft, valves, spark plugs, and injectors to understand their material, size, and design features.

Observation of Engine Assembly and Disassembly

- Demonstrations include dismantling a single-cylinder or multi-cylinder engine to show how parts fit together, followed by reassembly to understand alignment and timing.

Cut-Section Engine Study for Working Mechanism

- Using cut-section models, students observe the movement of piston, operation of valves, and flow of air/fuel mixture and exhaust gases during engine cycles.

Fuel Supply and Ignition System Demonstration

- Students examine the working of carburettors, fuel injectors, pump systems, spark plugs, and wiring to understand how fuel is delivered and ignited in SI and CI engines.

Performance Testing and Measurements

- Students participate in running a test-rig engine to measure parameters such as speed, fuel consumption, exhaust temperature, and observe mechanical power generation in real time.

Outcomes

1. Students will be able to identify and differentiate major IC engine components such as piston, crankshaft, valves, spark plug, and injector through hands-on observation.
2. Students will understand the assembly and disassembly procedures of IC engines, including alignment, valve timing, and correct fitment of parts.
3. Students will gain practical insight into the working mechanism of engines by observing cut-section models showing piston motion, valve operation, and gas flow.
4. Students will develop functional knowledge of fuel supply and ignition systems, enabling them to explain how carburettors, injectors, pumps, and spark plugs operate in SI and CI engines.

5. Students will acquire the ability to measure and interpret engine performance parameters such as speed, power, fuel consumption, and exhaust temperature from test-rig experiments.

Student Participation

- Total Students: 16
- Participation Mode: Laboratory
- Engagement: Students actively discussed, clarified doubts, and provided feedback to their peers.

Relavant PO's :

PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7

Participant Name List

S. NO	REGISTER NO	STUDENTS NAME
1	312821114002	Divya N
2	312821114003	Gokul P
3	312821114004	Guna S
4	312821114005	HariRaghavan C
5	312821114006	Kalaiselvan R
6	312821114007	Kannan S
7	312821114008	Karthick K
8	312821114010	Reshav Raj
9	312821114011	Sibi Raynord U
10	312821114012	Sivasakthi J
11	312821114013	Yuvaraj A
12	312821114301	Gokul S
13	312821114302	Meera T M
14	312821114303	Mohammed Jameel S
15	312821114305	Umar Faruk N
16	312821114306	Yuvaraj M

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Lab-Based Incidental Learning Method conducted on 15.02.2023 by Dr. L. Ranganathan for Thermal Engineering Course

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The valuable feedbacks can be provided in the below link for the above innovative teaching method.

https://docs.google.com/forms/d/1YZ86VaqVEwjdS7gUrqZuQoTYz0-yzZHlc0yShyO9ToI

Faculty In charge

HoD/Mech